

RESPONSE AND REQUEST FOR RECONSIDERATION

This document is submitted in response to the non-final office action dated March 19, 2009.

Applicants express their appreciation for the withdrawal of the previous rejection under 35 U.S.C. 102(b). In the previous office action the Examiner had presented a different rejection, under 35 U.S.C. 103(a), Fetterman in view of Davis, against some of the claims but not against the subject matter of former claims 17 through 19. In the previous response, claim 1 was amended to incorporate the subject matter of claim 17, so as to specify that the formulation has 0.8 to less than about 1.2% sulfated ash. As such, the current subject matter of claim 1 has not previously been rejected over Fetterman and Davis. The Examiner has now applied, for the first time, the teachings of Fetterman and Davis against the present claims. This is, thus, a new rejection.

Applicants, however, have addressed this general rejection previously, in their response submitted on August 13, 2008. That response included a Rule 132 Declaration from Virginia Carrick which provided a direct comparison of the technology of the present invention against the closest teaching of the closest reference, Fetterman. In the subsequent final office action, unexpectedly, the Examiner did not address the evidence of the Declaration, but merely stated, "The previous rejections of claims 1-16 are maintained and hereby incorporated by reference, herein." (The Examiner also noted at that time that the then-present lower limit on Sulfated Ash of 0.6% overlapped the upper limit of 0.6% in Fetterman. The lower limit has since been amended.)

Accordingly, the Examiner's attention is now specifically directed once again to the data presented in the Declaration of Virginia Carrick, signed by her on August 7, 2008, and submitted with the response on August 13, 2009.

The closest teaching in Fetterman is believed to be Example 1, in column 52. Example 1 contains:

- (a) an oil of lubricating viscosity
- (c) a nitrogen-containing dispersant, 7.57% on an oil-diluted basis.

This Example does not contain (b) a sulfurized olefin antiwear agent, as presently required. Instead, it contains a sulfurized alkylphenol antioxidant (sulfurized nonylphenol). The Example also has a Sulfated Ash level of 0.44%, which is well below the present lower limit of 0.8%. The bulk of the Sulfated Ash in the Example is provided by the presence of 0.51% of an overbased magnesium sulfonate detergent.

In order to make the most direct comparison, Ms. Carrick duplicated as nearly as possible Fetterman's Example 1 (designated here as "F Ex 1") and compared it against the same formulation but adjusted to be within the scope of the present invention. The

corresponding inventive Example (designated “Ex. D”) differs from Fetterman’s Example 1 by (1) using a sulfurized olefin antiwear agent rather than a sulfurized alkylphenol, in an amount to provide about the same sulfur content, and also (2) having a Sulfated Ash level of 0.88% rather than the reported level of 0.44% (measured: 0.52%). The increased Sulfated Ash was obtained by adding a conventional amount of an overbased calcium detergent. The results of this *first* comparison are summarized in the following table:

	%	F Ex 1	Ex D
Sulfurized phenol (58% active)		2.83	—
Sulfurized olefin antiwear agent (100% active)		—	1.21
Nitrogen dispersant (PIBSA-PAM, 58% active)		7.57	7.57
Overbased Mg sulfonate (58% active)		0.5	0.5
Overbased Ca sulfonate (58% active)		—	1.0
% P		0.096	0.099
%S		0.370	0.399
% Sulfated Ash (measured)		0.52	0.88
HFRR wear scar, μm		236	242

At a first look, it appears that the HFRR Wear Scar values are essentially unchanged. However, this actually represents a significant and unexpected improvement. Apart from the benefits derived from having a somewhat higher level of detergent-generated sulfated ash (that is, engine cleanliness and acid neutralization), it is well known that increasing the detergent and ash level is generally expected to adversely affect wear performance. This feature is clearly illustrated by comparing Ref C with F Ex 1. Ref C is identical to F Ex 1 but merely with a higher ash level, obtained by including additional detergent. The wear performance is significantly worsened:

	%	F Ex 1	Ref C
Sulfurized phenol (58% active)		2.83	2.83
Sulfurized olefin antiwear agent (100% active)		—	—
Nitrogen dispersant (PIBSA-PAM, 58% active)		7.57	7.57
Overbased Mg sulfonate (58% active)		0.5	0.5
Overbased Ca sulfonate (58% active)		—	1.0
% P		0.096	0.096
%S		0.370	0.394
% Sulfated Ash		0.52	0.88
HFRR wear scar, μm		236	259

Thus, the fact that the present invention is able to achieve good wear results despite the higher detergent and ash level is significant.

The results are even more pronounced and unexpected when the total amount of phosphorus in the formulation is reduced to less than 0.09 percent by weight, that is, by means of further reducing the amount of zinc alkyl dithiophosphate (ZDDP) antiwear agent. This particular feature is reflected in present claims 8 and 18, and separate consideration for these claims is solicited. See the results summarized below:

%	F Ex 1	F Ex 1' (lower P version)	Ex. B
Sulfurized phenol (58% active)	2.83	2.83	—
Sulfurized olefin antiwear agent (100% active)	—	—	1.21
Nitrogen dispersant (PIBSA-PAM, 58% active)	7.57	7.57	7.57
Overbased Mg sulfonate (58% active)	0.5	0.5	0.5
Overbased Ca sulfonate (58% active)	—	—	1.0
ZDDP (90% active)	1.35	1.07	1.07
% P	0.096	0.075	0.080
%S	0.370	0.334	0.346
% Sulfated Ash	0.52	0.45	0.82
HFRR wear scar, μm	236	255	206
4-Ball scar diameter, μm	n.d.	430	420
HTCP wear scar, μm	n.d.	398	332

Lowering the amount of phosphorus (and ZDDP) in Fetterman's example (to give F Ex 1') worsens wear performance, as expected. But in the present Example B, within the scope of the present claims, the wear performance is significantly improved, as measured in three separate tests. And not only is the wear performance better than the low P modification of Fetterman (F Ex 1'), it is actually improved compared with Example 1 of Fetterman itself (F Ex 1). These results are unexpected. It is therefore submitted that any *prima facie* obviousness is overcome by these unexpectedly improved results.

The same evidence of unobviousness applies equally to claims 11 and 20, for which the Examiner had further cited Schenck (claim 11) or Abraham (claims 11 and 20). That is, there is nothing in either of these references that would lead one to expect the improvement in wear performance at the claimed ash levels, as is achieved by the present invention. Moreover, as explained in the response submitted on August 13, 2009, the materials of Schenck are not hindered phenolic ester antioxidants at all. Their phenolic groups have been converted to phosphate esters and they are, instead, extreme pressure/antiwear agents.

Conclusion.

For the foregoing reasons it is submitted that the present claims are unobvious and in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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